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VIA EMAIL

PUBLIC DOCUMENT

Ms. Gloria Blue
Executive Secretary
Trade Policy Staff Committee
Office of the U.S. Trade Representative
600 17th Street, NW
Washington, D.C. 20508

Re: Steel Industry Section 201 Investigation—Supplement to Request for Exclusion of Certain Mold and Die Steel from Remedy Under Section 203 of 1974 Trade Act

Dear Ms. Blue:

On behalf of International Mold Steel, Inc. ("IMS"), we hereby provide for the public record in the above-referenced matter steel nominal chemistries that were treated as business proprietary information in IMS's original request for exclusion of nine certain types of mold and die steel from Section 203 relief.

In the public version of its original exclusion request submission,[1] IMS deleted the nominal chemistries of all nine products for which it requested exclusion. In a supplemental filing,[2] IMS publicly revealed most of these chemistries, but for IMS brands NAK 55, NAK 80, PX5, DH2F, CX1, DC53, and DH31-S, certain nominal chemistries were revealed only in summarized, ranged format. Actual nominal chemistries for the other two steel brands (Porcerax II and NAK HH) were provided in full.

Attached to this filing are replacements for the first page of each of the first nine exhibits to IMS's November 13 letter. The chemistries listed on the replacement pages are now completely unredacted and unranged, and are the chemistries originally listed in IMS's November 13 letter. The IMS product brand name is clearly indicated at the top of each page, and the products are in the same order as listed in the November 13 filing. The chemistries are nominal percentage amounts.

IMS continues to emphasize that nominal chemistries are not important for purposes of determining if the U.S. industry is capable of making a substitute product, because for mold and die steel the substitutability is determined by the mechanical and physical performance of the steel, and not the chemical composition.

Please contact the undersigned if you have any questions.

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[1] See IMS's letter to the USTR's Trade Policy Staff Committee ("TPSC") dated November 13, 2001 (exclusion documents X-134-IntlMold and X-134-IntlMold1).
[2] See IMS's letter to the TPSC dated November 30, 2001 (exclusion document X-134-IntlMold2).

Respectfully submitted,

Matthew J. Clark
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Counsel for International Mold Steel, Inc.

cc: Richard Weible, International Trade Administration

NAK 55 – No AISI designation

First produced and patented by Daido Steel in Japan in 1975. No grade is comparable in quality from producers in the U.S. The few attempts to produce NAK 55-type steel have failed because of quality and consistency issues.

After the Challenger disaster, NAK 55 was chosen as the mold steel for the re-designed O-Rings for shuttle boosters.

Chemistry (nominal)

Carbon	0.15%	Copper	1.00%	Nickel	3.00%
Manganese	1.50%	Silicon	0.30%	Aluminum	1.00%
Sulfur	0.10%	Moly	0.30%		

Production Method

Double melted: electric furnace then vacuum arc re-melt furnace. Hot rolled or forged to shape. Age hardened to HRc 40.

Mechanical Properties as Supplied

HRc 40		Yield (.2% offset, 41 HRc)	146,500 psi
Tensile 182,000 psi		Elongation in 2" (longitudinal)	15.6%
Reduction 39.8	%	Modulus of Elasticity (room temp.)	30.0 x 10^{-6} psi

Charpy V-Notch Impact Strength (toughness):

Longitudinal	7.2 ft/lb.
Transverse	5.6 ft/lb.
Hardness	40 HRc

Physical Properties

Coefficient of Thermal Expansion (x 10^{-6} in/in/F°)		Coefficient of Thermal Conductivity (BTU/ft• hr• F°)	
68 F° to 212 F°	6.3	At 200 F°	23.9
68 F° to 392 F°	7.0	At 400 F°	24.4
68 F° to 572 F°	7.5		

Magnetic Properties

Maximum Magnetic Permeability	380
Saturated Magnetism (Gauss)	16,350
Residual Magnetism (Gauss)	8,500

NAK 80 - No AISI designation

First produced and patented by Daido Steel, Japan in 1965. No comparable grade made in the USA.

Chemistry (nominal)

Carbon	0.15%	Copper	1.00%	Nickel	3.00%
Manganese	1.50%	Silicon	0.30%	Aluminum	1.00%
Moly	0.30%				

Production Method

Double melted: electric furnace then vacuum arc re-melt furnace. Hot rolled or forged to shape. Age hardened to HRc 40.

Mechanical Properties as Supplied

HRc 40		Yield (.2% offset, 41 HRc)	147,600 psi
Tensile	183,400 psi	Elongation in 2" (longitudinal)	16.1%
Reduction	41.9 %	Modulus of Elasticity (room temp.)	30.0×10^{-6} psi

Charpy V-Notch Impact Strength (toughness):

Longitudinal	8.1 ft/lb.
Transverse	8.5 ft/lb.
Hardness	40 HRc

Physical Properties

Coefficient of Thermal Expansion ($\times 10^{-6}$ in/in/F°)

68 F° to 212 F°	6.3
68 F° to 392 F°	7.0
68 F° to 572 F°	7.5

Coefficient of Thermal Conductivity (BTU/ft• hr• F°)

At 200 F°	23.9
At 400 F°	24.4

Magnetic Properties

Maximum Magnetic Permeability	380
Saturated Magnetism (Gauss)	16,360
Residual Magnetism (Gauss)	8,500
Coercive Force (Oersted)	14.0

Unique Characteristics

- Super clean, Vacuum-Arc Remelt manufacturing process.
- 40 HRc hardness

PX5 – No AISI designation

First produced and patented by Daido Steel of Japan in 1990. No grade is comparable in quality from producers in the U.S.

Chemistry (nominal)

Carbon	0.20%	Copper	0.10%	Nickel	0.20%
Manganese	1.90%	Silicon	0.10%	Aluminum	0.030%
Sulfur	0.035%	Phosphorous	0.010%	Chrome	2.10%
Moly	0.45%	Vanadium	0.15%		

Production Method

Electric furnace melted, ladle degassed and refined. Proprietary forging, rolling and heat-treating practices are utilized to produce and exceptionally fine-grained, stable, tough and easy to machine and weld mold steel. No comparable steel is produced in the U.S. The closest would be AISI P-20.

Mechanical Properties as Supplied

HRc 30-33		Yield	133,000 psi
Tensile	150,000 psi	Elongation in 2" (longitudinal)	20.%
Reduction	48. %		

Physical Properties

Coefficient of Thermal Expansion ($\times 10^{-6}$ /F°)		Coefficient of Thermal Conductivity (Btu/ft• hr• F°)	
86 F° to 212 F°	6.6	At 68 F°	24.53
86 F° to 392 F°	7.1	At 212 F°	24.48
86 F° to 572 F°	7.3	At 392 F°	24.31
86 F° to 752 F°	7.5	At 572 F°	22.67
86 F° to 1112 F°	7.8	At 752 F°	22.42

Unique Characteristics

Exceptionally clean steel with uniform microstructure – no pinholes, inclusions or hard spots.
30-33 HRc hardness
Uniform hardness throughout, even in heavy sections.

- 75% tougher than typical chrome-moly steels
- Patented chemistry suppresses weld cracking and hardness elevation in the heat-affected zone, eliminating the need for heat-treating and post-heating in most welding situations
- Machines 30-50% faster than any other P-20 type steel

PORCERAX II – No AISI designation

Developed and patented by Sintokogio Corp. in Japan and introduced in 1993. There is no comparable steel produced in the U.S. or the world.

Chemistry (nominal)

Carbon	0.02 %	Chrome	17 %
Moly	2.0 %	Copper	2.9 %
Silicon	0.7 %	Manganese	0.16 %

Production Method

Cold hydrostatic pressed powder with ferrous strengthening fibers then sintered.

Mechanical Properties

HRc 35-40		
Tensile Strength:		63990 - 71100 LBS./IN.2
Heat Transfer Co-efficient: Room Temp.		16.93 – 19.35 Btu/ft. hr.
Linear Expansion:	(@20 - 150°C)	6.67 – 6.94 in./in. F

Unique Characteristics

- The end product is 25% air by volume.
- The structure of the steel block is fully permeated by 3, 7 or 20 micron diameter, interconnecting pores.
- Gas will freely pass through a seemingly solid block of steel. Pre-hardened to 35-40 HRc for wear resistance.

Applications

The application for this product is to vent hot compressed gases from plastic injection molds. Small inserts of Porcerax II are installed in critical areas of molds constructed from any mold steel. The perfect venting allowed by Porcerax II allows molders to produce parts that were previously impossible to make because the parts would imperfect due to short shots and burning from the trapped gases.

DH2F – No AISI designation

DH2F was developed so as to offer die and mold makers an exceptionally tough, stable, yet, easy to machine steel. DH2F supplies an excellent machined surface finish. No U.S. mill produces a similar modified H-11 steel. Modified H-11 hot work die steel supplied at HRc 40.

Chemistry (nominal)

Carbon	0.37%	Manganese	0.70%[3]	Silicon	1.50%
Phosphorous	0.010%	Chrome	5.00%	Vanadium	0.80%
Moly	1.25%				

Plus free machining additives.

Production Method

Electric furnace melted, ladle degassed and refined. Proprietary forging, rolling and heat-treating practices are utilized to produce and exceptionally fine-grained, stable, tough and easy to machine and weld mold steel. No comparable steel is produced in the U.S.

Mechanical Properties as Supplied

HRc 38-42		Yield Strength	164,000 psi
Tensile	193,000 psi	Elongation in 2" (longitudinal)	10%
Reduction	17%		

Physical Properties

Coefficient of Thermal Expansion (x 10^{-6} /F°)

68 F° to 212 F°	4.94
68 F° to 392 F°	6.00
68 F° to 572 F°	6.61
68 F° to 752 F°	7.00
68 F° to 932 F°	7.28
68 F° to 1112 F°	7.61
68 F° to 1292 F°	7.72

Coefficient of Thermal Conductivity (Btu/ft• hr• F°)

At 20° C	26.8

Unique Characteristics

- 38-42 HRc hardness
- Through hardened for exceptional dimensional stability
- Cuts mold making costs by reducing man-hours required for machining. Classified as a 'free-machining' steel

[3] The original Mn amount of 1.50% listed in IMS's November 13 proprietary filing was incorrect. 0.70% is the correct amount.

CX1 – No AISI designation

International Mold Steel, Inc. is in the process of introducing two new advanced tool steels produced by Daido Steel, Japan. CX1 is the first cold work die steel offered in the world that is supplied pre-heat treated to HRc 50 and machines at this hardness. Higher hardness can then be obtained by flame hardening specific areas of the tool, or hard coating the tool. This simplifies the process of producing a stamping die, thus reducing lead-time and costs. No HRc 50 steel is produced in the U.S. CX1 should be excluded from any action.

Chemistry (nominal) Proprietary.

Carbon	0.80%	Chrome	1.00 %
Manganese	1.30%	Moly	0.80%

Production Method

Electric furnace melted, ladle degassed and refined. Proprietary forging, rolling and heat-treating practices are utilized to produce and exceptionally fine-grained, stable, tough and easy to machine and weld die steel. No comparable steel is produced in the U.S.

Mechanical Properties as Supplied

HRc 50	
Tensile Strength:	259,000 psi
Yield Strength:	238,000 psi
Elongation:	8 %
Reduction in Area:	19 %

Physical Properties

Coefficient of Linear Thermal Expansion (μ m/m K)

20 ° C to 200 ° C	12.9
20 ° C to 425 ° C	13.9

Coefficient of Thermal Conductivity (Btu/ft. H . ° F)

Temp. 20 ° C	30.7

Density: 7.71 (Mg/m^3)

Unique Characteristics

- The first and only 50 HRc pre-hardened tool steel easily machinable
- Cuts down cutting and processing time

DC53 – No AISI designation

Developed and patented by Daido Steel in Japan in 1988. Their goal was to develop an exceptionally tough, fine-grained cold-work die steel with the advantages of a high-tempering (Up to 550c) steel. DC53 was designed to significantly out perform AISI D-2 in a variety of cold work die applications.

Chemistry (nominal)

Carbon	1.00%	Chrome	8.00%
Moly	2.00%	Vanadium	0.28%

Production Method

Electric furnace melted, ladle degassed and refined. Proprietary forging, rolling and heat-treating practices are utilized to produce and exceptionally fine-grained, stable, tough and easy to machine and weld die steel. No comparable steel is produced in the U.S.

Mechanical Properties

Dependent on heat-treating applied.

Physical Properties

Coefficient of Thermal Expansion (x 10^{-6} / C°)

	Annealed
-100°	12.2
-200°	12.0
-300°	12.3
-400°	12.8
-500°	13.2
-600°	13.4
-700°	13.0

Coefficient of Thermal Conductivity (cal/cm• sec• C°)

	Quenched and Tempered
Room Temp	0.057
100°C	0.060
200°C	0.064
300°C	0.064
400°C	0.065
500°C	0.062
600°C	

Unique Characteristics

- Higher Hardness (62-63 HRc) than D2 after heat treating
- Twice the toughness of D2 with superior wear resistance
- 20% higher fatigue strength than D2
- Smaller primary carbides than D2 protect the die from chipping and cracking
- Secondary refining process (DLF) reduces impurities
- Machines and grinds up to 40% faster than D2

DH31-S - No AISI designation

DH31-S is a hot working die steel with the best balance of strength and toughness showing the comparable softening resistance to H-10 and twice the hardening ability of H-13.

Chemistry (nominal)

Carbon	0.40%	Manganese	0.60%
Chrome	5.60%	Moly	3.00%

Physical Properties

Coefficient of Thermal Expansion (x 10^{-6} /K)

20 – 100 ° C	11.0
20 – 200 ° C	11.4
20 – 300 ° C	11.8
20 – 400 ° C	11.8
20 – 500 ° C	12.1
20 – 600 ° C	12.4
20 – 700 ° C	12.6

Thermal Conductivity (W/m * K)

20 ° C	26.0
100 ° C	26.7
200 ° C	27.5
400 ° C	28.4
600 ° C	29.2
700 ° C	27.9

Specific Heat (J/kg * K)

20 ° C	435
100 ° C	452
200 ° C	478
400 ° C	554
600 ° C	707
700 ° C	883

Density (kg/m^3

20 ° C 7800

Unique Characteristics

- High hardening ability
- Bainite transformation starting time is twice as that of H-13, 103 min., quenching operation is easily and safely carried out without troubling such as toughness deterioration in large size dies.
- High strength – high softening resistance at elevated temperature contributes to high wear resistance.
- High toughness – DH31-S shows 60% higher toughness than H-13. High toughness is obtained even in large size dies due to high harden ability.

NAK HH – No AISI designation

NAK High Hard (NAK HH) was developed and patented by Daido Steel, Japan. It has the unusual properties of high hardness (HRc 45-48) combined with excellent machine ability. Its purpose is to reduce lead time and cost in the production of medium to long run plastic molds. No steel of similar chemistry or hardness if produced in the U.S. or Europe. This product is in the introduction stage in the U. S. market. U.S. mold makers are enthusiastic about the potential this product offers them to be competitive with offshore mold makers in the production of high-quality plastic injection molds.

Chemistry (nominal)

Carbon	0.11%	Silicon	0.30 %
Manganese	1.4 %	Sulfur	0.35 %
Copper	1.0 %	Nickel	3.0 %
Chrome	1.6 %	Moly	0.3 %
Aluminum	1.0 %		

Production Method

Double melted: electric furnace then vacuum arc re-melt furnace. Hot rolled or forged to shape. Age hardened to HRc 45-48.

Mechanical Properties as Supplied

Hardness 45 HRc	
Tensile Strength (MPa)	1385 longitudinal, 1359 transverse
Yield Strength (.2% MPa)	1031 longitudinal, 1009 transverse
Reduction of Area	22 % longitudinal, 6 % transverse
Elongation	11 % longitudinal, 4 % transverse
Charpy U-notch Impact Strength (J/cm sq)	16 longitudinal, 11 transverse

Physical Properties

Coefficient of Thermal Conductivity (Btu/ft. H . ° F)	
Temp. 20 ° C	43.9
Density:	7.78 (Mg/m^3)

Unique Characteristics

- Vacuum-Arc Re-meld manufacturing process
- 45-48 HRc